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ABSTRACT

Drafting students from vocational/technical and high schools frequently repeat the same experiences and courses and work with the same instructional materials when they enroll in college engineering drawing, and architecture programs. In order to minimize needless repetition and address the problem of articulation between such schools and the Catonsville Community College, a five-day workshop was convened during June 1977. Representatives from three vocational/technical schools, two high schools, and the college participated in the workshop to develop a proposal for an integrated curriculum. Participants agreed on and met six objectives: examine each institution's course objectives and learning sequences; compare objectives and learning experiences from all institutions; recommend changes to obtain uniformity; develop an articulation agreement; develop implementation procedures; and provide for followup and evaluation procedures. Appendices cover six course outlines: three college drawing and drafting courses and three vocational/technical and high school drafting courses. (TR)

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FINAL REPORT

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# ARTICULATION WORKSHOP IN DRAFTING

BEST COPY AVAILABLE

JC 780 382

CATONSVILLE COMMUNITY COLLEGE
AND
BALTIMORE COUNTY HIGH SCHOOLS AND VOCATIONAL TECHNICAL SCHOOLS

June 20-25, 1977

The funds for this workshop were provided by a grant from the State Board of Community Colleges. The Director of the Workshop was Joseph A. Scarlett, Director of Career Programs, and the Chairperson for the Workshop was Lester M. Zink, Assistant Professor, Architectural and Engineering Design Technology, Catonsville Community College.

CATONSVILLE COMMUNITY COLLEGE

CATONSVILLE, MARYLAND 21228

June 24, 1977

The workshop to prepare an Articulation Agreement between the Baltimore County High Schools and Vocational Technical Schools and Catonsville Community College in the Drafting areas has recommended and agreed upon the articulation policies and procedures as described in the appended report. The net result should be closer coordination between faculty of the participating institutions, improved visibility and access to the college program for the student and more rapid and effective progress by the student after he or she has entered the college program.

Workshop Participants

For Catonsville Community College

Lester M. Zink

Lester M. Zink, Chairperson

For the Baltimore County High Schools

Thomas G. Shipley

Thomas G. Shipley
Loch Raven Senior H.S.

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Dulaney Senior High School

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Dennis J. Strauss

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## INTRODUCTION

Students completing curricula in high schools and vocational-technical schools often repeat the same courses in college. To try to eliminate this needless repetition and to address the problem of articulation between high schools, vocational-technical schools and Catonsville Community College (C.C.C.), this workshop was convened for the week of June 20 through June 24, 1977. Representatives from three vocational-technical schools, Southeastern, Eastern and Western; two high schools, Dulaney and Loch Raven; and Catonsville Community College (C.C.C.) participated in the workshop.

In engineering drawing and architectural drafting areas, the workshop participants determined that drafting students often repeat introductory courses on the college level. C.C.C. has a credit by examination policy by which the student may challenge many of the college courses for credit. However, many students do not do this because they do not want to take a written test.

By having an integrated program, a student would be aware that he or she could bypass the college course by doing a good job on the high school level. This would provide incentives for the student to go on and complete the degree requirements on the college level, to strive for excellence on the high school and vocational-technical school level, and even to encourage enrollment in the high school drafting program from the junior high school level.

This document is the result of the workshops efforts to ease the transition from high schools to college. Not only were the participants able to come up with concrete articulation proposals, but through working together got to know each other and the program at each institution. From this workshop a spirit of continuing cooperation has developed which will make it possible for better communication between the high schools and vocational-technical schools and C.C.C.

## PROJECT OBJECTIVES

PART I

On the first day of meetings the workshop participants agreed upon six objectives for the project.

1. Examine each institution's course objectives and learning sequences in the drafting areas.
2. Compare the course objectives and learning experience.
3. Recommend changes, if necessary, to obtain uniformity in course objectives, and learning experiences.
4. Develop an articulation agreement.
5. Develop implementation procedures at the participating institutions.
6. Develop follow-up procedures to evaluate the effectiveness of the articulation agreement.

Part II.

## Articulation Agreement

### Baltimore County High Schools and Vocational Technical Schools to Catonsville Community College

Catonsville Community College has agreed to grant college credit to students completing the Drafting Program at a Baltimore County High School or Vocational Technical School for the following courses:

| | | |
|---|---|---|
| AED 101 | Engineering Drawing I | 3 credits |
| AED 102 | Engineering Drawing II | 4 credits |
| ARC 111 | Architectural Drafting I | 3 credits |

The following criteria must be met in order for the students to receive the credits:

1. Students shall complete the applicable portions of the Drafting Program at a Baltimore County High School or Vocational Technical School with an average of B or better.

2. Credit for the applicable articulated courses shall be awarded upon receipt of a letter of certification from the Drafting Department at the student's school signed by the Department Chairman and the student's instructor(s).

3. Request for the credit must be made within three years of the students graduation from the High School or Vocational Technical School.

4. The letter of certification shall mean that the student has satisfied the requirements of the applicable approved drafting program at the High School/ Vocational Technical school and has also received instruction in the following areas which are included in the CCC articulated courses but are not uniformly included as part of all the High School/Vocational Drafting programs.

| Articulated Course | *Area (See CCC syllabus in Appendix) |
|---|---|
| AED 101 | Electronic and Electrical Drawing<br>Piping and Welding Drawings and<br>Structural Drawings<br>Topographical and Engineering<br>Map Drawings |
| AED 102 | Descriptive Geometry<br>Vectors (Graphic Solutions)<br>Numerical Control<br>Automated Drafting |

4. Articulated Course

ARC 111

*Area (See CCC syllabus in Appendix) (cont.)

Perspective Drawing (one point and two points)
Shades and Shadows
Presentation Drawings (Rendering)

*Note: The treatment and coverage of these areas in the High School/Vocational Technical School shall be at least to the extent defined by the applicable CCC syllabus. (This articulation agreement implies that any areas on the applicable CCC syllabus not noted above are uniformly included in the Baltimore County High School/Vocational Technical School Drafting Program.)

CREDIT PER ARTICULATION AGREEMENT

High School and Vocational-Technical Schools to
Catonsville Community College

IMPLEMENTATION PROCEDURE

I. Implementation Procedure at the Community College

A. To implement the articulation agreement at the community college, the following procedure is proposed:

1. The college will set up admissions office and record office procedures to handle students that are certified for credit from High School/ Vocational-Technical schools. (See Part I-B below for sample procedure.)

2. Program coordinators at the college will interview the students and maintain files for follow up of students receiving the certification for credit.

B. Suggested procedure for community college admission of student with letter of certification.

1. When applying for admission to CCC, the student will present the letter of certification along with the application for admission.

2. The Records Office at the College will grant a grade of "S" for the course(s) certified. The grade(s) will be recorded on the student's record with the notation "Credit Per Articulation Agreement," and the letter of certification retained in the student's file.

3. The College Records Office will forward a copy of the student's record with the course credit awarded to the Program Coordinator. The Program Coordinator will notify the High School/Vocational-Technical School instructor of action taken.

4. The student may register for the next course in the curriculum sequence.

II. Implementation Procedure at the High School/Vocational-Technical Schools.

A. To implement the articulation agreements at the High School/Vocational-Technical schools the following procedure is proposed:

1. The schools will communicate the details of agreements to the Coordinator of Industrial Arts and Vocational Education, principals, teaching faculty, guidance personnel, work-study coordinators and students.

II. Implementation Procedure (cont.)

2. The schools will develop methods of publicizing the agreements in order to encourage students to take advantage of this opportunity.

3. The schools will develop a procedure for certifying students for credit in the course or courses for which he or she is eligible for articulation credit. The original of this letter will be given to the student, a copy will be mailed to the CCC Architectural Engineering program coordinator. (See sample letter of certification.)

III. Articulation Agreement Maintenance and Review

A. The Articulation Agreement shall be reviewed at least every three years by representatives of the Industrial Arts and Vocational Technical Programs and the CCC Architectural Engineering Design Technology Program.

B. Revisions of applicable course syllabi at any of the participating schools or CCC should be sent to the applicable instructors.

Sample Letter of Articulation Certification

High School/Vocational-Technical School

TO: CCC _____ Representative/Coordinator

FROM: Recommending School _____

Re: Student Name: Articulated Credit Certification

This is to certify that _____ has successfully
Name
completed the _____ Program as of _____. Based upon
Certification Date
the articulation agreement it is recommended that credit be given for the following courses: (Enrollment must occur within two years of the certification date.)

(List applicable college course(s):

_____

_____

_____

The undersigned certify that the student has met the criteria as defined in Part II of the Articulation Agreement for courses produced by representatives of Baltimore County High Schools and Vocational-Technical Schools and Catonsville Community College dated _____ and has at least a B average.

_____
Instructor

_____
Principal

---

(FOR COLLEGE USE ONLY)

Interview with representative of Catonsville Community College _____ Department

Date _____

_____
Department Representative

Verification of Credit

_____
Division Head

## FOLLOW UP PROCEDURE

The following procedures were agreed upon by the workshop participants to provide for objective evaluation of the articulation agreement, develop a greater understanding of each institution's progress and allow for a more precise evaluation of students accomplishment.

Procedure for follow up:

1. The program coordinator at the college will maintain records of students certified for articulated credit.
2. For the first three years, progress of students receiving credit will be monitored.
3. Progress of each student at the end of each semester will be provided to the recommending teacher. (See Credit Per Articulation Student Evaluation form.)
4. At the end of three years the articulation agreement will be evaluated for:
   - A. Student performance in advanced courses in drafting.
   - B. Percentage of students who complete the degree or certificate program.
   - C. Percentage of students who drop out.
   - D. Percentage of change in the number of vocational-technical students enrolled.
   - E. Career and/or educational plans of these students.

(SAMPLE FORM)

## CREDIT PER ARTICULATION

## STUDENT EVALUATION

Name _____

Semester: Fall ____ Spring ____ Summer ____ Year _____

College: Catonsville _____

High School/Vocational Technical School Attended: _____

Credit Per Articulation Agreement:

AED 101 ____

AED 102 ____

ARC 111 ____

Total Hours Completed: _____

College Major: _____

Specialized Courses Completed This Semester (List):

| Course # | Course Title | Grade |
|---|---|---|
| _____ | _____ | ____ |
| _____ | _____ | ____ |
| _____ | _____ | ____ |
| _____ | _____ | ____ |
| _____ | _____ | ____ |

Overall Q.P.A. _____

Instructor's Evaluation (If Known): 1st Third ____ 2nd Third ____ 3rd Third ____

Comments (Strong Points and Weak Points in Architectural Engineering Program.)

CATONSVILLE COMMUNITY COLLEGE

ENGINEERING DRAWING I AED 101 (3:2,3)* Instructor _____

TEXT: Fund. Engr. Drawing 6th Edition
Problemset "GRAPHICS & GEOMETRY" by Earle

| Week | Topic and Reading Assignment | Text Chapter | Lab Problems: Text Book | Lab Problems: Lab Book |
|---|---|---|---|---|
| | BASIC DRAFTING TECHNIQUES | | | |
| 1 | Orientation, Freehand Lettering Drawing Format, Scales | 1,2,3 | | 15,16,17,19 |
| 2 | Drawing Equipment and Use (Line Types, Standards) | 3 (cont) | T47-1,3,10-13 | |
| 3 | Engineering Geometry (Basic) | 4(Thru pg. 65) | Fig. 4.23, 4.24, 4.25, T72-15 | 21, 22 |
| | SHAPE DESCRIPTION AND SPATIAL RELATIONSHIP | | | |
| 4 | Theory of Projection<br>Multiview Representation<br>Basic Dimensioning, Symbols | 5<br>6 | Fig. 6.62, 6.69 | 24,35,26 |
| 5 | Conventional Practices | 6 | Fig. 6.46, 6.53 (a&b), 6.91 | 37,38 |
| 6 | Sectional Views | 8 | T155-2 | 42,43,44,45 |
| 7 | Auxiliary Views | 9 | Fig. 9.4, 9.11<br>Fig. 9.21-1,2,3,4,5 | 39,40,41 |
| 8 | Freehand Technical Drawing | 7 | Fig. 7.12, 7.11, 7.19, 7.20, 7.22 | 25,27,36 |
| 9 | SKETCHING - Isometric, Oblique & perspective - Basic design procedure - Creative thinking | 13 | Fig. 12.9,12.10, 12.12,12.16,12.40<br>Fig. 12.54<br>T308 any problem | 28,30,33 |
| **10 | Dimensioning & Specifications Details and Assemblies | 16 | Fig. 16.81, 16.91 | 99,100,101 102, 103 |
| | ENGINEERING AND WORKING DRAWINGS | | | |
| 11 | Electronic and Electrical Dwgs. | 24 | T543-1,7 | 18 |
| 12 | Architectural Drawings<br>Basic Terminology and Floor Plans | 26 | T581-1,8 | |

LZ 9/75 Rev 1: 9/76

| Week | Topic and Reading Assignment | Text Chapter | Lab Problems Text Book | Lab Book |
|---|---|---|---|---|
| 13 | Piping & welding drawings & structural drawings | 21,22,25 | T502-1,4-T511-4<br>T561-1 | |
| 14 | Topographical & Engineering Map Drawings | 27 | T586 (Lots 39, 40 51, 52, 53)<br>T592(Stat. 668-670) | |
| 15 | Reproduction Techniques<br>Review of Course | 30 | T74-26, 27 | |
| 16 | Final Exam | | | |

* 3 Credit Hour Course; 2 hours/week lecture and 3 hour/week lab

**The above outline and problems are completed by AED Program Majors and others. Electronics majors will follow a separate outline.

NOTES:

1. Class projects and lab assignments in place of or in addition to those listed may be assigned by the instructor.
2. See separate "AED Drafting Course information sheet" for suggestions on required equipment and class procedures.
3. Generally, four tests will be given during the semester plus a final exam. The lowest test grade may be dropped. No make-up tests will be given.
4. Grading Policy: (General) Turn in Lab Problems as a weekly set. Staple problems together. Identify as "Week 1", "Week 2", etc. A letter grade will be assigned to these. Final grade is weighted approximately as follows:

| | |
|---|---|
| 1. Lab Assignments | 60% |
| 2. Tests | 20% |
| 3. Final Exam | 20% |
| | 100% |

ENGINEERING DRAWING II AED 102 (4:2,6) INSTRUCTOR _____

Text: Fundamentals of Engineering Drawing 6th Ed. by Luzadder & Problem Set #1 by Earle

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| WEEK | TOPIC AND READING ASSIGNMENT | TEXT CHAP. | LAB ASSIGNMENT | |
|---|---|---|---|---|
| | SPATIAL GEOMETRY FOR DESIGN & ANALYSIS | | Text | Problem Set |
| 1 | Descriptive Geometry | 10 | | 47,48,49, |
| 2 | Descriptive Geometry (cont.) | 10 | | 53,54,56, 63,64,65 |
| 3 | Vector Geometry Read 10.22 - 10.32 | 10 | T212-1,2,3,4,5 | 67,69 |
| 4 | Vector Geometry Read 10.33010.41 Auxilliary Views (secondary) Read 9:16 | 10 | T213-9,11,14,15 | 90,82,8 |
| | DEVELOPMENTS AND INTERSECTIONS | | | |
| 5 | Developments Read 11.1-11.23 | 11 | Fig.11.14 Fig.11.20 | 76,77,78,79 |
| 6 | Intersections Read 11.24 - 11.43 | 11 | T.242-7 #3, -8 #3 | 73,74,75 |
| | GRAPHICS FOR DESIGN AND COMMUNICATION | | | |
| 7 | Shop Processes Read 14.1-14.22 | 14 | | |
| | Detail Representation, Threads Read 15.1 - 15.34 | 15 | Fig.15-13 Fig.15.14 T348-1 | 110,111 |
| 8 | Dimensioning Read 16.1-16.33 | 16 | | 106,107,108 109 |
| 9 | "Drawing Systems" & Assembly Drawings Read 17.1-17.18 | 17 | | 112 |
| 10 | Machine Elements (Gears, Cams) | 20 | Gear Prob. T489-7,8 | |

| WEEK | TOPIC AND READING ASSIGNMENT | TEXT CHAP. | LAB ASSIGNMENT Text | Problem Set |
|---|---|---|---|---|
| **PICTORIAL PRESENTATION AND DESIGN** | | | | |
| 11 | Technical Illustration<br>Read 12.1-12.42<br>Review Chapter 7 | 12 | Fig.12.66-12.69<br>other: make sketch or drawing showing form & function of a mechanical or electrical device (similar to Fig.13.5) | |
| 12 | Design<br>Read 13.1-13.15 | 13 | T308-17 | |
| **SPECIALIZED FIELDS** | | | | |
| 13 | Automated Drafting<br>Computer-Aided Design<br>Numerical Control<br>Read 18.1-18.21<br>Read 19.1-19.6 | 18<br>19 | Problem NC 1 Design<br>drilled block<br>Write program<br>Punch Tape<br>Demonstrate Results | 113 |
| 14 | Tool Design<br>Read 23.1-23.10 | 23 | T 527-4<br>other: summarize the procedure in paragraph 23.9 on engineering drawing forms. Use statements and/or sketches | |
| 5 | Structural Drawings<br>Read 25.1-25.14 | 25 | T563-1(do on "C" size sheet) | |
| | Graphs<br>Read 28.1-28.32 | 28 | | 89,91,95 |

Catonsville Community College

ARC 111 Architectural Drafting (3: 1,6)*

*(3 Credits: 1 hr lecture, 2 hrs lab)

Text: Architectural Drawing by Muller
Material: 8½" x 11" and 18" x 24" Vellum

Instructor: L. Zink
H125, ext. 442

| Week | Dates | Topic and Reading Assignment | Lab Assignment** |
|---|---|---|---|
| 1 | Feb 11,12 | Chap. 1 Drafting Equipment<br>Discussion of Architectural Drafting | Start Project 1 |
| 2 | Feb. 18,20 | Chap. 2 Lettering<br>Chap. 3 Basic Technical Dwg | pg. 38 #6<br>pg. 54 #1-6<br>pg. 56 orthographic dwg of 1 2 4 5 |
| 3 | Feb. 25,27 | Chap. 4 Iso, Oblique Dwgs<br>Chap. 5 Freehand Sketching | 4-6 4-10<br>5-4 5-9 5-10<br>5-12 5-13 5-26A<br>5-38 (make print & shade)<br>5-27, 5-28 |
| 4 | Mar. 4,6 | Chap. 6 Light Construction Principles | 5-32, 5-34<br>5-37, 6-3B,D |
| 5 | Mar. 11,13 | Chap. 6, Lt. Const. Prin. | Start Project 2<br>Summarize 6-5<br>6-17 6-24 |
| 6 | Mar. 18,20 | Chap. 7, Basic Residential Planning | 6-27 6-29B 6-33 |
| 7 | Apr. 1,3 | Chap. 8, Drafting Expression | 6-53<br>7-33(provide explanation) |
| 8 | Apr. 8,10 | Chap. 9, Architectural Details | 8-8<br>9-9 Rough Opening<br>9-23 |
| 9 | Apr. 15,17 | Chap. 10 Working Dwgs | 9-13<br>Rough Opening |
| 10 | Apr. 22,24 | Chap. 11 Mechanical Systems | 11-1 Upflow<br>sk ch 11-22 |
| 11 | Apr. 29, May 1 | Chap. 11 Electrical Systems | 11-30 |

| Week | Dates | Topic and Reading Assignment | Lab Assignment |
|---|---|---|---|
| 12 | May 6,8 | Chap. 12 Perspective Dwg (Office Method) | 12-12 Start Project 3 |
| 13 | May 13,15 | Chap. 12 Shades & Shadows | 12-18 12-37 |
| 14 | May 20,22 | Chap. 13 Presentation Dwgs and Rendering | 13-5 B,C,F |
| 15 | May 27,29 | Chap. 15 Specifications | -- |
| 16 | FINAL EXAMINATION | | |

Notes: Lab assignments are due following the week in which they are scheduled except for major projects.

CATONSVILLE COMMUNITY COLLEGE

ARC111 Architectural Drawing (3: 1,6)*

*(3 Credits; 1 hr. lecture, 2 hrs. lab)

PROJECTS

1. The Garage: Given a reduced size set of drawings, prepare a set of working drawings for the garage. Draw to ¼"=1' scale with scale of details as noted on the reduced copies.

   a. Check prints due by March 4
   b. Corrections (revised print) due by March 11

2. The House: Working from the information in Chap. 10 and figs. 10-10 through 10-15, prepare and partial set of working drawings and other drawings as follows: (Use scales indicated)

   a. A Plot Plan (Similar to Fig. 10-2 but suited to the colonial house) Instructor will provide plot data. Check print due _____

   b. Foundation Plan (Fig. 10-10) Check print due _____

   c. First Floor Plan (Fig. 10-11) Check print due _____

   d. Second Floor Plan (Fig. 10-12) Check print due _____

   e. Front Elevation and Left Elevation (Include door and window schedules) Check print due _____

   f. Front Wall Detail & Fireplace Dwgs Check print due _____

   g. A Pictorial Dwg of 1st floor (oblique type) Drawing due _____

   Note: Final set of prints due _____

3. Presentation Drawing of the House (A rendering)

   This is to be a perspective drawing in pencil or any other media you desire to use.

   Finished drawing due May 29.

# APPENDICES

## COURSE OUTLINES

COURSE OUTLINES

HIGH SCHOOLS AND VOCATIONAL-TECHNICAL HIGH SCHOOLS

I. COURSE OUTLINE: FUNDAMENTALS OF DRAFTING

| WEEK | CONTENT TOPICS | PROGRAM GOALS |
|---|---|---|
| 1/2 | I. Orientation | Identify and use the orientation procedures described by the instructor. |
| * | II. Drafting Techniques | Identify and use the drafting procedures, tools and equipment related to the drafting field. |
| 9 | III. Orthographic Projection | Solve orthographic problems; produce orthographic drawings from real objects, pictures, sketches, etc. |
| 8 | IV. Sectioning | Solve sectioning problems and produce drawings from real objects, pictures, sketches, etc. |
| 9 | V. Developments and Intersections | Solve development and intersection problems and produce drawings from real objects, pictures, sketches, etc. |
| 9 | VI. Pictorial | Solve pictorial drawing problems and produce drawings from real objects, pictures, sketches, etc. |
| 1/2 | VII. Geometric Construction | Solve geometric construction problems and apply geometric construction principles to the solution of drafting problems. |

* The content in this unit would be included as needed in conjunction with each of the other units in the course.

III. COURSE CONTENT - OBJECTIVE - ACTIVITY - EVALUATION SEQUENCE: FUNDAMENTALS OF DRAFTING

| CONTENT TOPICS | SPECIFIC PROGRAM OBJECTIVES | STUDENT ACTIVITIES | ASSESSMENT PROCESS |
|---|---|---|---|
| I. Orientation | The student will: | | |
| A. Personnel System | be aware of personnel systems in industry as they relate to the classroom. | Participate in the personnel system. | |
| B. Classroom Procedures | be aware of operating procedures in industry as they relate to the classroom. | Maintain appropriate conduct in classroom. | |
| C. Course Description and Objectives | be aware of the content and activities of the course as they relate to industry | Participate in discussion related to topic. | |
| D. Historical Background | be aware of the origin and importance of drafting and its impact and contributions to a technological society. | Participate in discussion and carry out research related to topic. | |
| E. Occupational Information | be able to identify occupations within the drafting industry. | Participate in discussion and carry out research related to topic. | |
| II. Drafting Techniques | | | |
| A. Selection and Use of Tools | be able to identify and use basic drafting equipment as utilized and dictated by the content. | Use drafting tools as necessary. | |
| B. Lettering | be able to letter legibly. | Develop acceptable lettering techniques. | |
| C. Alphabet of Lines | be able to identify the need for line symbols in drafting | Use appropriate lines on drawings and sketches. | |

III. COURSE CONTENT - OBJECTIVE - ACTIVITY - EVALUATION SEQUENCE: FUNDAMENTALS OF DRAFTING

| CONTENT TOPICS | SPECIFIC PROGRAM OBJECTIVES | STUDENT ACTIVITIES | ASSESSMENT PROCESS |
|---|---|---|---|
| II. Drafting Techniques (Cont'd.) | The student will: | | |
| D. Sketching | be aware of the techniques and procedures used in sketching. | Use freehand sketching which incorporates the use of arcs, circles and straight lines. | |
| III. Orthographic Projection | | | |
| A. Sketching | be aware of the means of formulating, expressing, and recording ideas. | Prepare preliminary sketches of orthographic problems. | |
| B. Shape Description | be aware of the method of representing an object on paper in a manner which will describe the exact shape and proportions. | Prepare multi-view drawings from real objects, pictures, sketches, etc. | |
| C. Size Description | be aware of the numerical values of measurement as well as notes and symbols to specify size, kinds of finish, materials, and other information necessary for manufacturing. | Dimension orthographic drawings. | |
| D. Drafting Techniques | be aware of the correct manipulation of drawing instruments and the methods of developing drawings. | Utilize drafting techniques in the sketching, preparation, and dimensioning of orthographic drawings. | |

III. COURSE CONTENT - OBJECTIVE - ACTIVITY - EVALUATION SEQUENCE: FUNDAMENTALS OF DRAFTING

| CONTENT TOPICS | SPECIFIC PROGRAM OBJECTIVES | STUDENT ACTIVITIES | ASSESSMENT PROCESS |
|---|---|---|---|
| IV. Sectioning | The student will: | | |
| A. Full section | be aware of the various methods utilized in detailing interior portions of an object. | Identify and prepare a sectioned drawing from real objects, pictures, sketches, etc. | |
| B. Half section | | | |
| C. Offset section | | | |
| D. Revolved section | | | |
| E. Removed section | | | |
| F. Broken out section | | | |
| G. Aligned section | | | |
| H. Drafting techniques | be aware of the correct manipulation of drawing instruments and methods of developing drawings. | Utilize drafting techniques in the preparation of sectional drawings. | |
| V. Developments and Intersections | | | |
| A. Parallel line | be aware of the method for developing three dimensional objects from a single plane. | Identify and prepare development and intersection drawings from real objects, pictures, sketches, etc. | |
| B. Radial line | | | |
| C. Triangulation | | Construct a paper model (optional). | |
| D. Intersections | | | |

III. CO ...E CONTENT - OBJECTIVE - A...TIVITY - EVALUATION SEQUENCE: FUNDAMENTALS OF DRAFTING

| CONTENT TOPICS | SPECIFIC PROGRAM OBJECTIVES | STUDENT ACTIVITIES | ASSESSMENT PROCESS |
|---|---|---|---|
| V. Developments and Intersections (Cont'd.) | The student will: | | |
| E. Drafting Techniques | be aware of the correct manipulation of drawing instruments and the methods of developing drawings. | Utilize drafting techniques in the preparation of development and intersection drawings. | |
| VI. Pictorial | | | |
| A. Oblique | be aware of the basic methods of showing the appearance of objects in three dimensional form. | Identify and prepare pictorial drawings as listed from real objects, pictures, sketches, etc. | |
| B. Isometric | be aware of the correct manipulation of drawing instruments and methods of developing drawings. | Utilize drafting techniques in the preparation of pictorial drawings. | |
| C. Perspective | | | |
| D. Drafting techniques | | | |
| VII. Geometric Construction | | | |
| A. Dividing lines | be aware of the use of geometric methods for making technical drawings and for solving technical problems by diagrams. | Perform geometric constructions as they apply to drafting; i.e., bisect a line, bisect an angle, etc. | |
| B. Regular shapes | | | |
| C. Tangencies | | | |

I. COURSE OUTLINE: ADVANCED DRAFTING

| WEEK | CONTENT TOPICS | PROGRAM GOALS |
|---|---|---|
| 1 | I. Orientation | Identify and use the orientation procedures as given by the instructor. |
| 2 | II. Gears | Identify the use of various types of gears in industry and produce working drawings of gears. |
| 2 | III. Cams | Identify the use of various types of cams in industry and produce drawings of cams. |
| 2 | IV. Threads | Identify the use of various types of threads in industry and specify where appropriate. |
| 2 | V. Fasteners | Identify the use of various types of fasteners in industry and specify where appropriate. |
| 21 | VI. Working Drawings | Identify and produce assembly and detail drawings. |
| 3 | VII. Auxiliaries | Identify and produce auxiliary drawings. |
| 1½ | VIII. Dimensioning for Manufacturing | Identify and apply dimensioning techniques and methods as related to manufactured products. |
| 1½ | IX. Shop Processes | Develop an understanding of the basic shop processes as they relate to drafting. |

III. COURSE CONTENT - OBJECTIVE - ACTIVITY - EVALUATION SEQUENCE: ADVANCED DRAFTING

| CONTENT TOPICS | SPECIFIC PROGRAM OBJECTIVES | STUDENT ACTIVITIES | ASSESSMENT PROCESS |
|---|---|---|---|
| I. Orientation | The student will: | | |
| A. Personnel Systems | be aware of personnel systems in industry as they relate to the classroom. | Participate in the personnel system. | |
| B. Classroom Procedures | be aware of operating procedures in industry as they relate to the classroom. | Appropriate conduct in classroom. | |
| C. Course Description | be aware of the content and activities of the course as they relate to industry. | Participate in discussion related to topic. | |
| II. Gears | | | |
| A. Types and Uses | become familiar with the types and uses of gears. | Prepare gear drawing and gear cutting data chart. | |
| B. Terminology | become familiar with gear terminology. | | |
| C. Representation | identify and apply simple representation technique. | | |
| III. Cams | | | |
| A. Functions | identify the kinds of cams, their functions and their various motions, and be able to apply the representation technique | Produce cam drawings as related to a design problem. | |
| B. Kinds of Cams | | | |
| C. Types of Motion | | | |
| D. Representation | | | |

III. COURSE CONTENT - OBJECTIVE - ACTIVITY - EVALUATION SEQUENCE: ADVANCED DRAFTING

| CONTENT TOPICS | SPECIFIC PROGRAM OBJECTIVES | STUDENT ACTIVITIES | ASSESSMENT PROCESS |
|---|---|---|---|
| IV. Threads<br>A. Forms and Use<br>B. Nomenclature<br>C. Thread Representation | The student will:<br>develop an understanding of the forms, nomenclature, and representation methods used in describing threads. | Produce thread representatives and specify threads as required. | |
| V. Fasteners<br>A. Bolts and Nuts<br>B. Studs<br>C. Screws<br>D. Miscellaneous | develop an understanding of various types of fasteners and their application. | Produce fastener representations and specify as required. | |
| VI. Working Drawings<br>A. Assemblies<br>B. Details<br>C. Part Number System<br>D. Title Block and List of Material<br>E. Dimensioning | develop an understanding of the various elements of working drawings and their applications. | Produce working drawings from real objects, pictures, sketches, etc. | |

III. COURSE CONTENT - OBJECTIVE - ACTIVITY - EVALUATION SEQUENCE: ADVANCED DRAFTING

| CONTENT TOPICS | SPECIFIC PROGRAM OBJECTIVES | STUDENT ACTIVITIES | ASSESSMENT PROCESS |
|---|---|---|---|
| VII. Auxiliaries | The student will: | | |
| A. Functions | identify and apply the functions of primary and secondary auxiliaries. | Produce primary and secondary auxiliaries. | |
| B. Primary | | | |
| C. Secondary | | | |
| VIII. Dimensioning for Manufacturing | | | |
| A. Tolerance and Fits | identify and apply dimensioning techniques and methods as related to manufactured products. | Use worksheets to develop understanding. | |
| B. Datum Line | | | |
| | | Incorporate dimensioning techniques on drawings. | |
| C. Coordinate | | | |
| D. Tabular | | | |
| E. Surface Symbols | | | |
| IX. Shop Processes | | | |
| A. Precision Measuring | become familiar with fundamental shop terms and processes and their use on drawings. | | |
| B. Rough Forming | | | |
| C. Finishing | | | |
| | | Audio-visual | |
| D. Assembling | | | |

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I. COURSE OUTLINE: ARCHITECTURAL DRAFTING

| WEEK | CONTENT TOPICS | PROGRAM GOALS |
|---|---|---|
| 1 | I. Orientation | Identify and use the origination procedures given by the instructor. |
| 1 | II. House Styles | Acquaint the student with past architectural styles as they influence contemporary house design. |
| 1 | III. Site Considerations | Acquaint the student with the information necessary to select a home site. |
| 2 | IV. Area Planning | Provide the student with the information necessary to plan a house with a comfortable living environment. |
| 9 | V. Floor Plans | Provide the necessary information to develop workable floor plans. |
| 7 | VI. Elevations | Provide the necessary information to develop workable elevations. |
| 7 | VII. Details and Sections | Provide the necessary information to develop workable details and sections. |
| 2 | VIII. Framing | Become familiar with acceptable framing procedures. |
| 1 | IX. Plumbing | Provide the necessary information to develop workable plumbing plan. |
| 1 | X. Air Conditioning | Provide the necessary information to develop workable air conditioning plans |
| 1 | XI. Electrical | Provide the necessary information to develop workable electrical plans. |
| 1 | XII. Estimating | Provide the necessary information for the process of estimating. |
| 1 | XIII. Specifications | Provide the necessary information for the writing of house specifications. |
| 1 | XIV. Financing | Provide the student with information regarding the various methods of financing. |

III. COURSE CONTENT - OBJECTIVE - ACTIVITY - EVALUATION SEQUENCE: ARCHITECTURAL DRAFTING

| CONTENT TOPICS | SPECIFIC PROGRAM OBJECTIVES | STUDENT ACTIVITIES | ASSESSMENT PROCESS |
|---|---|---|---|
| I. Orientation | The student will: | | |
| A. Personnel System | be aware of personnel systems in industry as they relate to the classroom. | Participate in the personnel system. | |
| B. Classroom Procedures | be aware of operating procedures in industry as they relate to the classroom. | Maintain appropriate conduct in classroom. | |
| C. Course Description and Objectives | be aware of the course as it relates to industry. | Participate in discussion related to topic. | |
| D. Historical Background | be aware of the origin and importance of drafting and its impact and contributions to a technological society. | Participate in discussion and carry out research related to topic. | |
| E. Occupational Information | be able to identify occupations within the drafting industry. | Participate in discussion and carry out research related to topic. | |
| II. House Style | | | |
| A. Types of Houses | identify house types and apply acquired information to select a suitable type for a given location. | Research house plan book and magazines. | |
| B. Type of Roofs | identify roof types and apply acquired information to select a suitable roof for the house that the student is designing. | Research house plan books and magazines. | |

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III. CO..SE CONTENT - OBJECTIVE - ..TIVITY - EVALUATION SEQUENCE: ARCHITECTURAL DRAFTING

| CONTENT TOPICS | SPECIFIC PROGRAM OBJECTIVES | STUDENT ACTIVITIES | ASSESSMENT PROCESS |
|---|---|---|---|
| II. House Style (Cont'd.)<br>C. Styles | The student will:<br>illustrate the relationships of the styles and cultures of the past and present and their possible influences on the future so that each student design will be aesthetically sound. | Research house plan books and magazines. | |
| III. Site Considerations<br>A. Solar Orientation | be aware of neighborhood and site considerations as they relate to the present and future needs of the family for which the house is being designed. | Establish criteria for client or self. May be accomplished by:<br>interviewing parents, teachers, friends, etc.<br>guest speakers<br>visual aids<br>field trips. | |
| B. Topography | | | |
| C. Wind | | | |
| D. Noise | | | |
| E. Community (zoning) | | | |
| F. Community Service | | | |

III. COURSE CONTENT - OBJECTIVE - ACTIVITY - EVALUATION SEQUENCE: ARCHITECTURAL DRAFTING

| CONTENT TOPICS | SPECIFIC PROGRAM OBJECTIVES | STUDENT ACTIVITIES | ASSESSMENT PROCESS |
|---|---|---|---|
| IV. Area Planning<br>A. Living<br>1. Living room<br>2. Dining room<br>3. Den<br>4. Recreation room<br>5. Family room<br>6. Porches<br>7. Patios<br>8. Traffic areas<br>9. Entrances<br>B. Sleeping<br>1. Bedrooms<br>2. Baths<br>C. Service<br>1. Kitchen<br>2. Utility<br>3. Garage or carport<br>4. Home workshop<br>5. Storage | The student will:<br>identify the components of various areas and design them to perform their function. | List rooms.<br>List function.<br>List furniture necessary to perform functions.<br>Cut out furniture templates.<br>Experiment with furniture templates to create size and shape of rooms.<br>Select desired room templates for floor plan development. | |
| V. Floor Plans<br>A. Room Arrangement Considerations, and Placements<br>1. Closets<br>2. Windows<br>3. Doors<br>4. Mechanical<br>5. Stairs<br>6. Bearing and non-bearing walls | have an understanding of the ways in which an architect arrives at a comfortable living accomodation for a client within acceptable criteria. | Draw an original floor plan.<br>Activities include:<br>Room and closet template arrangements and adjustments.<br>Sketching of various arrangements.<br>Study window and door catalogues for selection. | |

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III. COURSE CONTENT - OBJECTIVE - ACTIVITY - EVALUATION SEQUENCE: ARCHITECTURAL DRAFTING

| CONTENT TOPICS | SPECIFIC PROGRAM OBJECTIVES | STUDENT ACTIVITIES | ASSESSMENT PROCESS |
|---|---|---|---|
| V. Floor Plans (Cont'd.)<br>7. Exterior Walls<br>8. Basement Plan | The student will: | List mechanical considerations and identify those applicable to his house.<br>Solve stair problems.<br>Identify bearing and not bearing walls. Select wall construction. | |
| B. Footing or Foundation Plan | illustrate the necessity of a level and uniformly distributed support for a structure. | Draw a footing/foundation plan. | |
| C. Drafting Techniques<br>1. Alphabet of lines<br>2. Dimensioning<br>3. Floor plan symbols<br>4. Scale | use drafting techniques to graphically represent architectural drawings. | Apply previously learned and new drafting skills to new situations to accomplish above. | |
| VI. Elevations | | | |
| A. Types<br>1. Front<br>2. Rear<br>3. Left<br>4. Right<br>5. Oblique<br>6. Interior | show the design, materials, dimensions, and the final appearance of the exterior/interior. | Make preliminary elevation sketches and produce elevation drawings as required. | |
| B. Considerations<br>1. Window and door placement<br>2. Exterior covering | | | |

III. COURSE CONTENT - OBJECTIVE - ACTIVITY - EVALUATION SEQUENCE: ARCHITECTURAL DRAFTING

| CONTENT TOPICS | SPECIFIC PROGRAM OBJECTIVES | STUDENT ACTIVITIES | ASSESSMENT PROCESS |
|---|---|---|---|
| VI. Elevations (Cont'd.)<br>C. Drafting Techniques<br>1. Elevation symbols<br>2. Dimensioning<br><br>VII. Details and Sections<br>A. Stairs<br>B. Cornice<br>C. Window<br>D. Kitchen<br>E. Bath<br>F. Fireplace<br>G. Box Sill<br>H. Special Features<br>I. Exterior Wall<br>J. Truss | The student will:<br><br>understand the construction and application of construction techniques and functions of details listed. | Product detail and section drawings as required. | |

III. COURSE CONTENT - OBJECTIVE - ACTIVITY - EVALUATION SEQUENCE: ARCHITECTURAL DRAFTING

| CONTENT TOPICS | SPECIFIC PROGRAM OBJECTIVES | STUDENT ACTIVITIES | ASSESSMENT PROCESS |
|---|---|---|---|
| VIII. Framing<br>A. Floor<br><br>B. Roof<br><br>IX. Plumbing<br>A. Sewage and Waste<br><br>B. Water Supply<br>C. Natural Gas<br><br>X. Air Conditioning<br>A. Heating<br><br>B. Cooling<br><br>C. Insulation<br><br>D. Electronic Air Filtering<br><br>E. Code<br><br>F. Symbols | The student will:<br>understand the construction techniques and functions of roof and floor framing.<br><br>have a basic and broad understanding of plumbing for liquid and gas distribution.<br><br>have a basic and broad understanding of heat and cooling systems. | Calculate live and dead loads for floor and roof designs.<br><br>Select structural members and note size on appropriate drawings.<br><br>Develop basic plumbing drawings involving hot and cold water and waste lines.<br><br>Study sewage systems.<br><br>Field trip to water filtration plant or sewage disposal plant.<br><br>Compute heat loss for a room.<br><br>Ascertain the heat loss factor for students wall section. | |

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III. COURSE CONTENT - OBJECTIVE ACTIVITY - EVALUATION SEQUENCE: ARCHITECTURAL DRAFTING

| CONTENT TOPICS | SPECIFIC PROGRAM OBJECTIVES | STUDENT ACTIVITIES | ASSESSMENT PROCESS |
|---|---|---|---|
| XI. Electrical | The student will: | | |
| A. Symbols | become familiar with the electrical code and symbols required to plan house wiring. | Design and draw electrical plan for house. | |
| B. Code | | | |
| C. Planning | | | |
| XII. Estimating | | | |
| A. Quantity of Materials | understand the kinds of materials needed to construct a house and have some idea of the cost of labor and material. | Estimate materials for student plan. | |
| | | Estimate cost by square foot. | |
| B. Total Cost (Labor and Materials) | | Research labor wages. | |
| XIII. Specifications | become familiar with the function and writing of building specifications. | Complete a sample VA or FHA specification form. | |
| XIV. Financing | | | |
| A. Financing | become familiar with the three primary methods of financing (VA, FHA, Conventional) | Guest speaker on financing. | |
| B. FHA | | | |
| | | Compare costs of the three methods of financing. | |
| C. Conventional | | | |